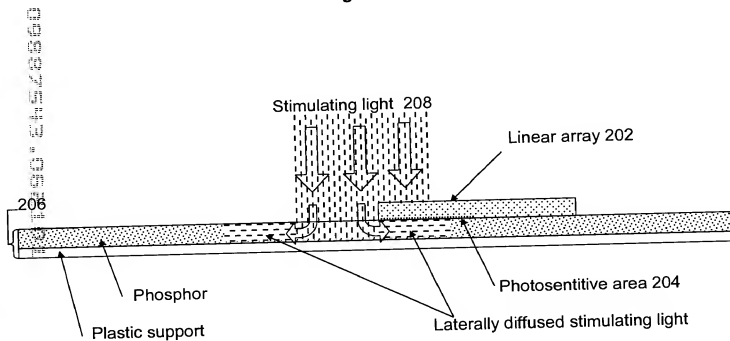


**Fig.1**



**Fig.2**

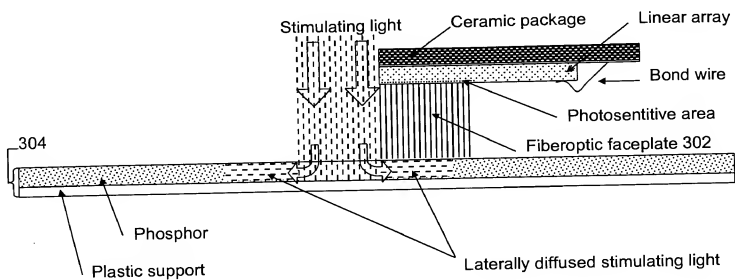


Fig. 3

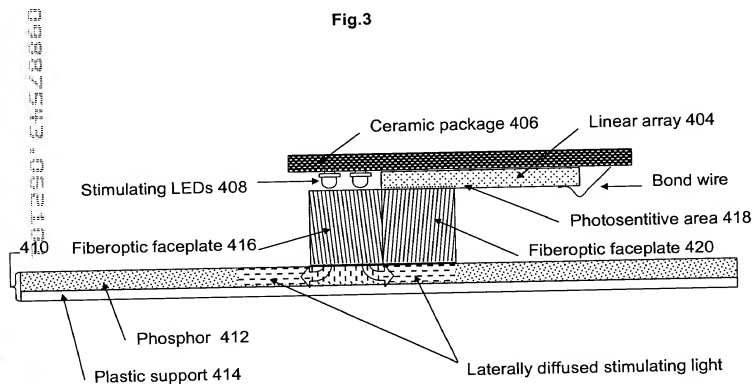


Fig. 4

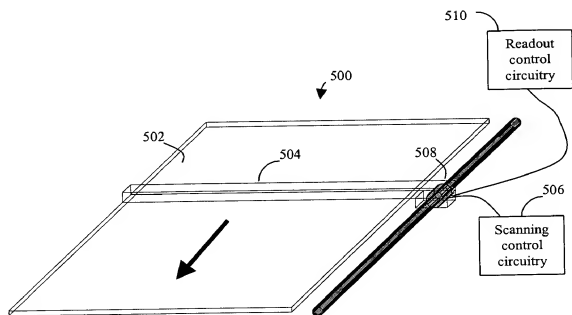


Fig.5

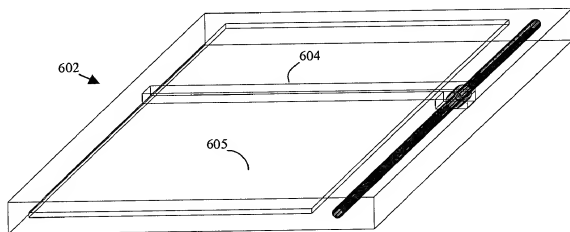


Fig.6

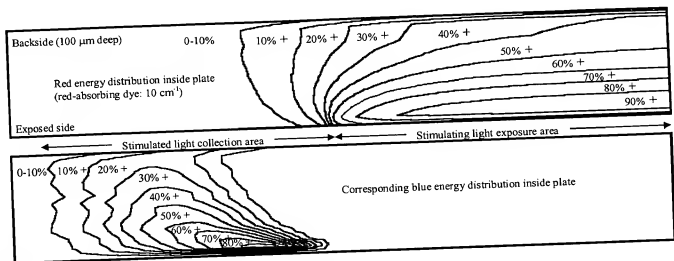


Fig. 7a

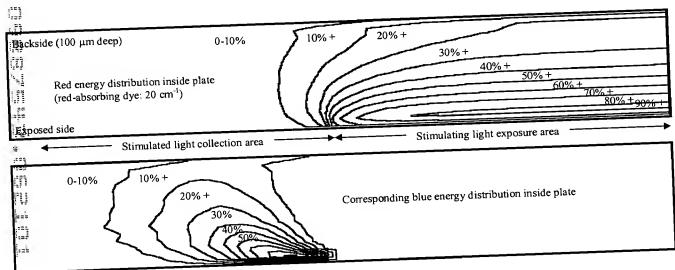


Fig. 7b

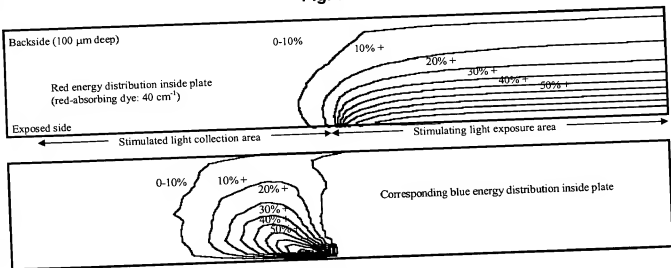


Fig. 7c

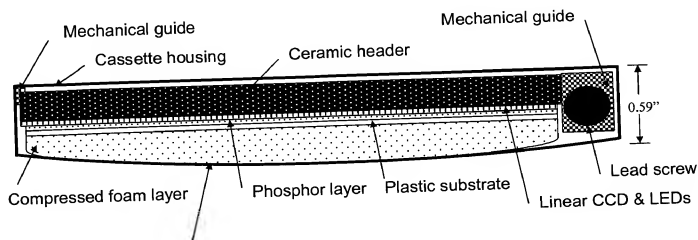


Fig. 9

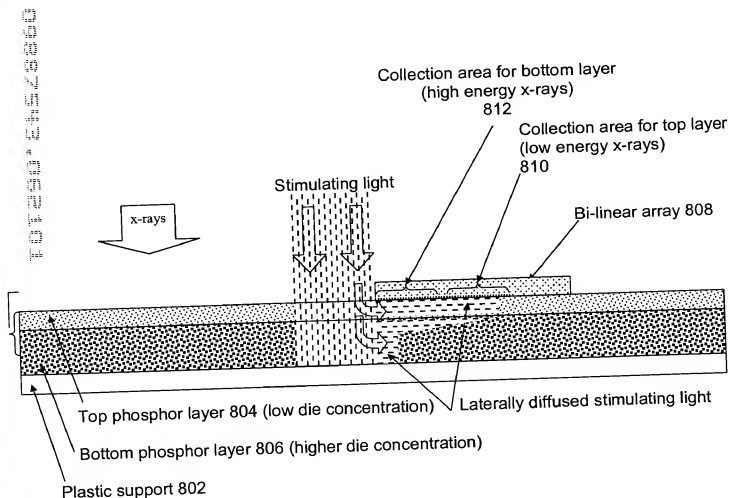
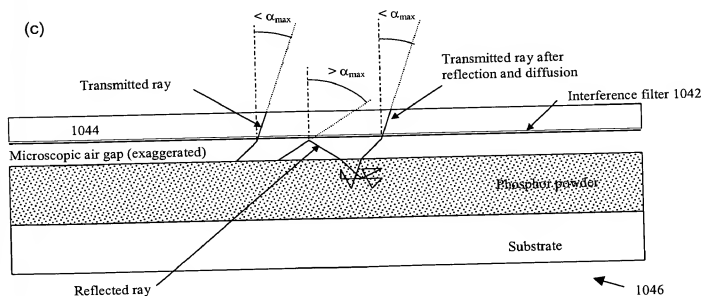
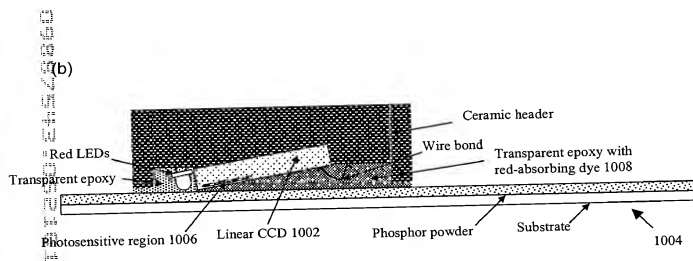
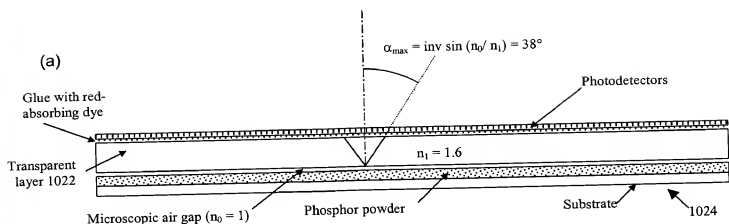
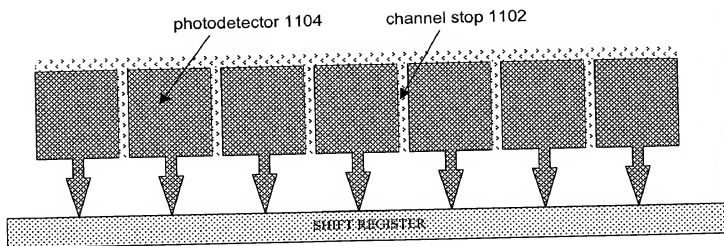


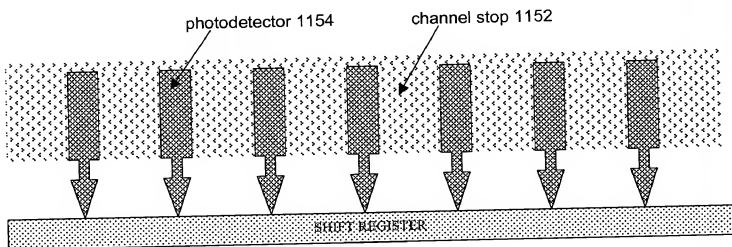
Fig. 8

Fig.10





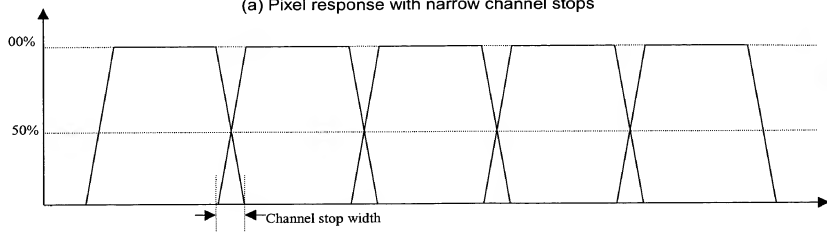
(a) Prior art



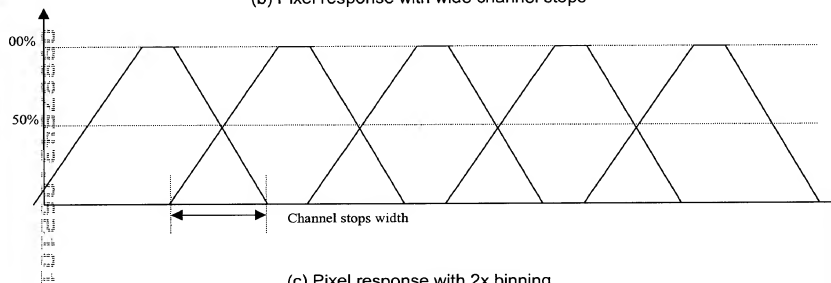
(b) design

Fig. 11

(a) Pixel response with narrow channel stops



(b) Pixel response with wide channel stops



(c) Pixel response with 2x binning

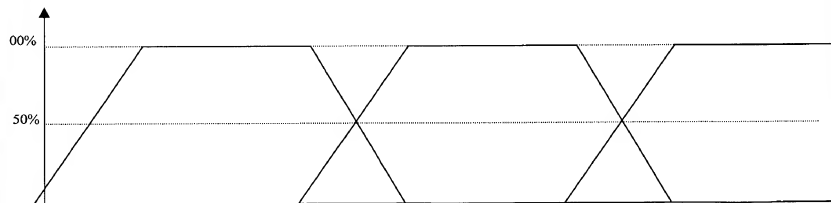
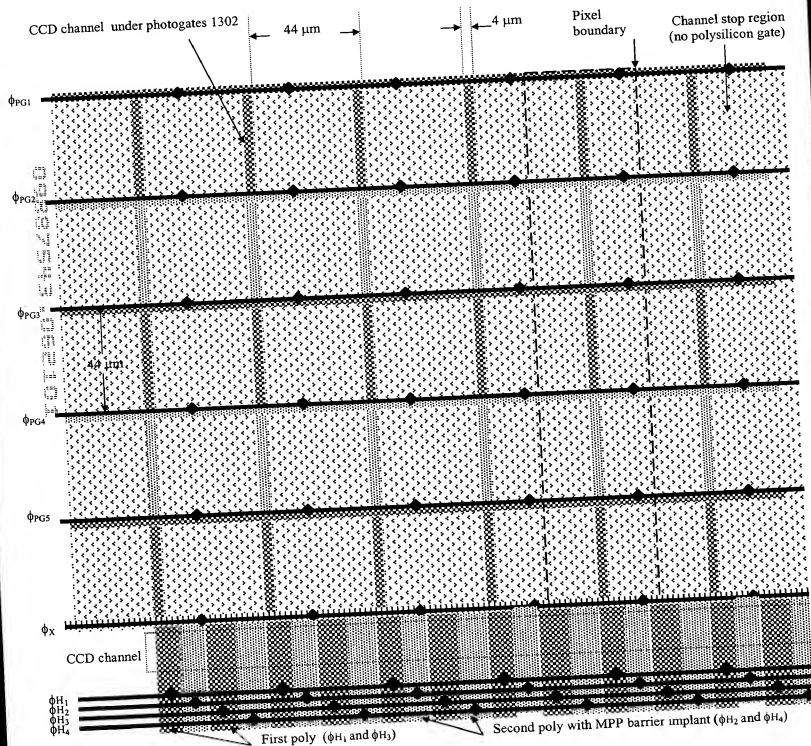
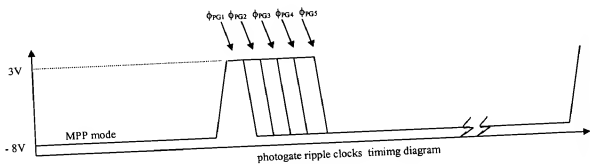


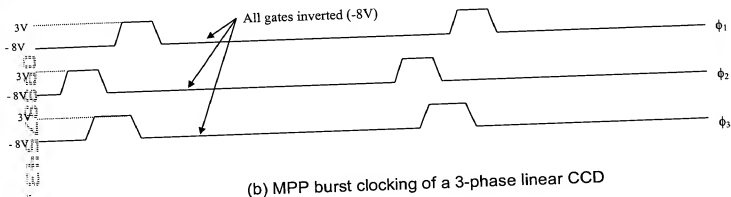
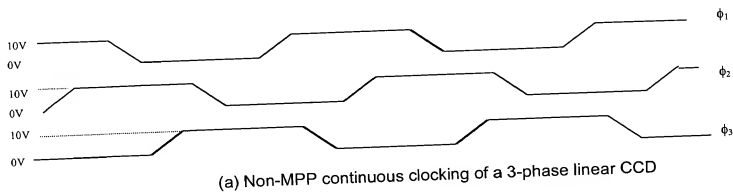
Fig. 12



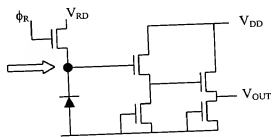
Fig. 13



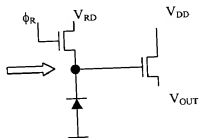
\_\_\_\_\_



**Fig. 15**



(a) dual-stage amplifier for linear CCD  
(prior art)



(b) single-stage amplifier for linear CCD

Fig. 16

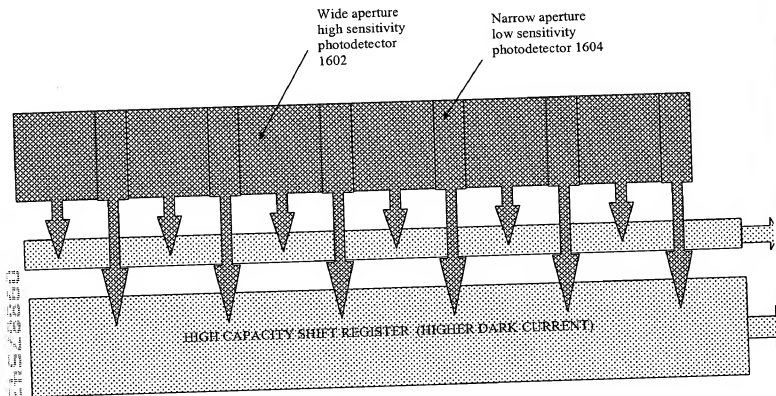


Fig. 17

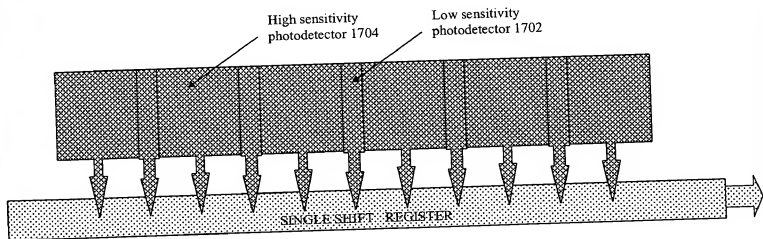


Fig. 18

Linear CCD specifications for storage-phosphor image plate reading

CCD architecture	Linescan (photosites & single register)
Photosite dimension	220 $\mu\text{m}$ high x 44 $\mu\text{m}$ wide (44 $\mu\text{m}$ pitch)
Photosite design	5 photogates/pixel (44 $\mu\text{m}$ high x 4 $\mu\text{m}$ wide)
Shift register cell dimension	60 $\mu\text{m}$ x 44 $\mu\text{m}$ on a 44 $\mu\text{m}$ pitch
Shift register design	2poly/2 $\phi$ or 4 $\phi$ switchable (with center split)
Shift register operation	Uni or bidirectional 2 $\phi$ or 4 $\phi$ (MPP mode)
Pixel count	2048 pixels
Die size	90.1 mm x 2.25 mm
Total dark current	< 20 pA/cm <sup>2</sup> MPP mode at 25°C
Shift register dark current (MPP mode)	25e <sup>-</sup> /cell for 2ms integration at 40°C
Photogate charge transfer inefficiency (lag)	< 50e <sup>-</sup> at 1000 e <sup>-</sup> signal level
Well Capacity	10 <sup>6</sup> e <sup>-</sup>
Amplifier readout noise	5 e <sup>-</sup> at 250 kHz (single-stage amplifier)
Output configuration	1 or 2 outputs in split mode (opposite ends)
Effective Quantum Efficiency (uncoated)	> 50% at 400nm (63% QE x 80% FF)
Effective Quantum Efficiency (AR coated)	> 75% at 400nm (94% QE x 80% FF)
Open photogate fill factor (no poly coverage)	> 80%
Maximum readout speed	500 kHz
Binning	4x
Charge Transfer Efficiency	0.99999
Buttability	3 side buttable (< 22 $\mu\text{m}$ dead space)

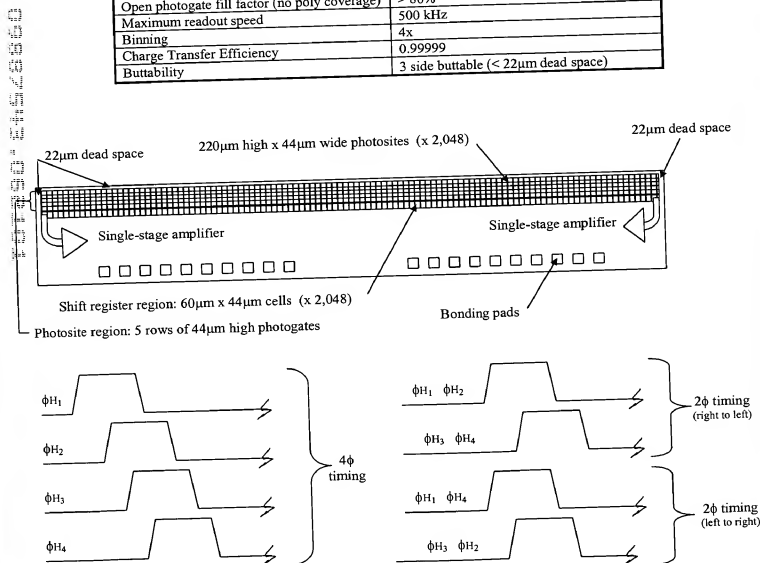


Fig. 19

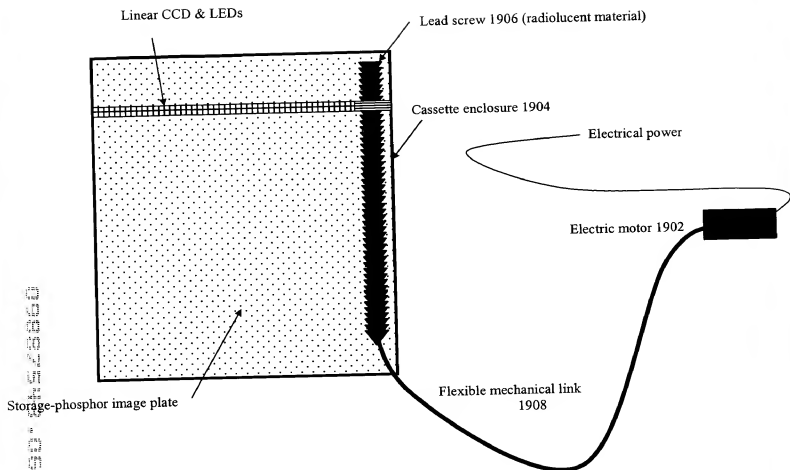


Fig. 20

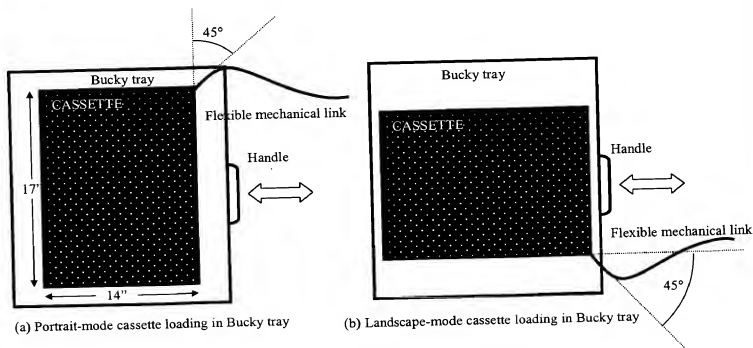


Fig. 21

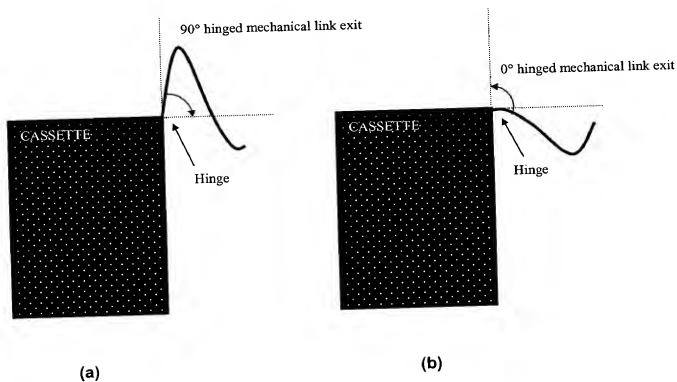


Fig. 22

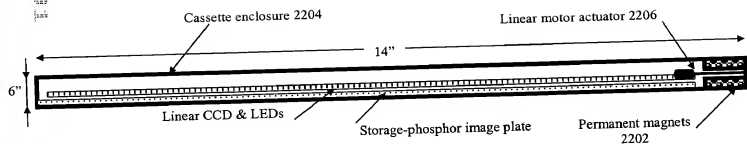


Fig. 23

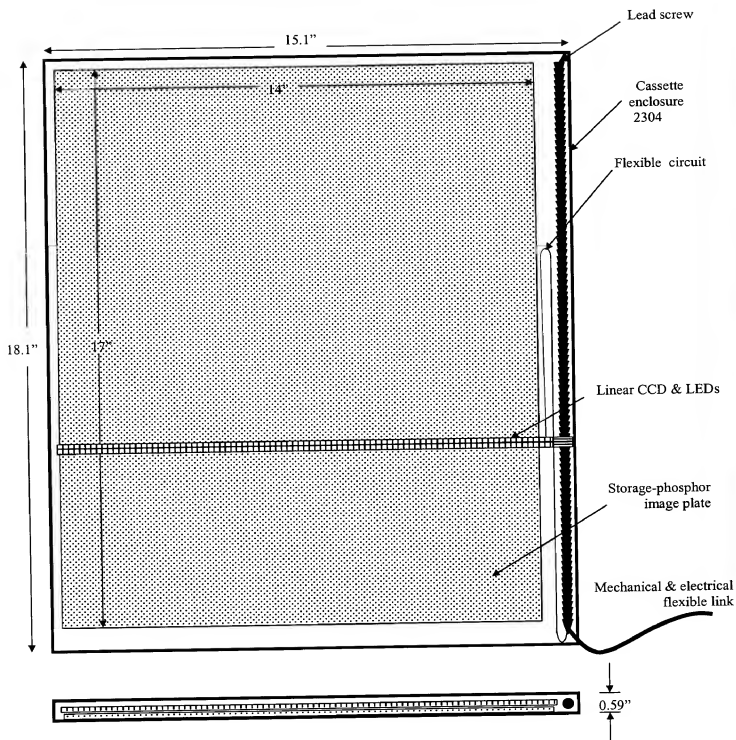
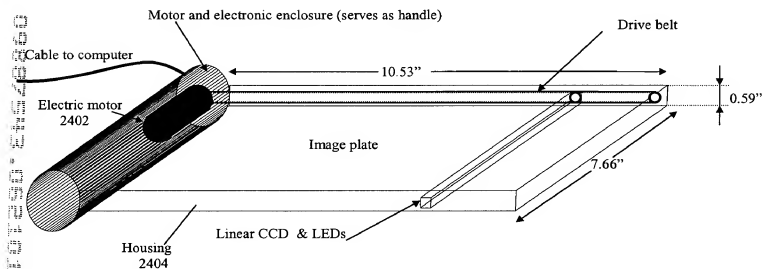


Fig. 24



Mammography cassette enclosure (fits in standard 18cm x 24 cm bucky)